

31. (Amended) An improved method for partially or completely removing organic coatings, films, layers or residues from a substrate, said method comprising:

(1) subjecting said organic coatings, films, layers, or residues to a vapor consisting essentially of water-free gaseous sulfur trioxide for a period of time, said substrates being maintained at a temperature in the range from about room temperature to 400°C; and

(2) subjecting said organic coatings, films, layers, or residues to a solvent rinse;

wherein the improvement comprises the following steps:

(a) providing organic coatings, films, layers and residues that are selected from the group consisting of polymerized photoresists, paints, resins, single and multilayer organic polymers, organo-metallic complexes, positive optical photoresist, negative optical photoresist, electron-beam photoresists, X-ray photoresists, ion-beam photoresists, ion-implanted photoresists, and other hardened photoresists, wherein said organic polymers are selected from the group consisting of polyimides, copolyimides, polyamides, polyamide-imides, fluorinated polyimides, poly(arylenethers), fluorinated poly(arylenethers), perfluorinated alkylene oxides, parylene (N, C, D, or F type), poly(phenylquin-oxalines), poly-naphthalene, poly-fluorinated naphthalene, benzocyclobutene (BCB), amorphous fluoropolymers selected from the group consisting of polytetrafluoroethylene, perfluorocyclobutane aromatic ether (PFCB), and fluorinated carbon, and wherein said substrate consists of at least one portion of a device selected from the group consisting of semiconductor devices and wafers, liquid crystal display devices, flat-panel displays, printed circuit boards, magnetic read/write heads, thin-film read/write heads;

(b) subjecting said organic coatings, films, layers, or residues of step (a) to a precursor chemical or physical treatment prior to step (1) capable of facilitating the reaction of said sulfur trioxide with the organic coatings, films, layers or residues to be removed;

(c) carrying out said step (1) so that said water-free, gaseous sulfur trioxide reacts with said organic coatings, films, layers, and residues to form physically or chemically altered organic material;

(d) carrying out said step (2) to remove said altered organic material from said substrates; and